Problem Set #7
Principles of Microeconomics
Professor Hungerman

1. Suppose that a firm in a perfectly competitive industry makes pizza and has a *marginal cost function* that equals q^2. Thus, the marginal cost of producing the fourth pizza is $4^2 = 16$.

A. Is this marginal cost curve compatible with the law of diminishing returns?

B. Suppose the price of a pizza equals $25 (expensive pizza!). Suppose also that for this firm average variable cost (AVC) is always rising. With this in mind, what amount will the firm produce in the short run? (Assume fixed costs are zero.)

C. Draw a picture of what total variable costs look like for this firm, with quantity on the x axis and TVC on the y axis.

D. Draw this firm's supply curve

E. Suppose that the only variable input is labor, and that each unit of labor costs $3 (that is, P_L = $3). What is the formula that relates marginal cost and marginal product of labor? Use this formula to come up with the formula for this firm's marginal product of labor. Explain what is going on with this firm's marginal product of labor.

2. Question 3 from the book, page 261

3. Question 4 from the book, page 261. (Note that answering *g* and *h* before *f* might be easier)

4. Suppose a firm in a perfectly competitive industry sells corn, and the firm's *average variable cost function* is $(q - 3)^2 + 3$. This is a parabola that reaches its minimum at the point $q = 3$.

A. What is this firm's shutdown point? (The answer should be a price and a quantity.)

B. At the point $q = 3$, what is marginal cost?

C. Suppose the firm has total fixed cost, in the short run, of $50. What is this firm's average total cost function?